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THREE NEW SPECIES OF *HANNEMANIA*
(ACARINA, TROMBICULIDAE)
FROM AMPHIBIANS OF WESTERN MEXICO.¹

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ABSTRACT: *Hannemania anurae*, n. sp. is described from 1 km NE Santa Lucia, Sinaloa, Mexico, type host *Syrhophus modestus pallidus*; other hosts are *Hyla arenicolor*, *Hyla eximia*, *Rana montezumae*, *Rana pipiens*, *Rana pustulosa*, *Rana sinaloae*, and *Rana tarahumarae*; and also known from Nayarit and Jalisco. *Hannemania monticola*, n. sp. is from 1.6 km W Buenos Aires, Durango, Mexico, type host *Hyla eximia* and other hosts are *Ambystoma rosaceum* and *Tomodactylus saxatilis*. *Hannemania saxicola*, n. sp. is from 23.5 km SW Buenos Aires, Durango, Mexico, type host *Tomodactylus saxatilis*.

INTRODUCTION

Investigations of the chiggers from amphibians taken in western North America have revealed a number of species belonging to the genus *Hannemania*. Recently, Loomis and Welbourn (1969) redescribed *H. hylae* (Ewing) and named *H. bufonis*, both from southwestern United States and Sonora, Mexico. The present paper describes three new species of *Hannemania* from the Mexican states of Durango, Jalisco, Nayarit and Sinaloa.

The genus *Hannemania* was proposed by Oudemans (1911) and has been placed in the subfamily Leeuwenhoekinae. The larvae of this genus can be distinguished from other similar genera by the presence of a distally expanded flange possessing recurved teeth on the cheliceral

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blade, an anteromedian projection of the scutum, and lack of stigmata and tracheae. The larvae of this genus have been found imbedded in the skin of amphibians of the New World.

We wish to thank numerous students in Biology at California State College, Long Beach who assisted in collecting the amphibians as well as the preparation of the chiggers, including S. William Agnew, Richard M. Davis, Julius C. Geest, David G. Marqua, P. H. Sullivan, Linda M. Williams and William J. Wrenn. We are grateful to L. M. Hardy and Dr. J. Knox Jones, Jr. of The University of Kansas for amphibians collected under U.S. Army Research and Development Command Contract DA49 192 MD 2215. We are also grateful to Elaine Katzer for the fine illustrations.

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***Hannemania anurae*, new species**

Figure 1

Types. — Holotype and 10 paratypes from 1 km NE Santa Lucia, 1128 m, Sinaloa, Mexico, from *Syrrophus modestus pallidus* Duellman, original numbers WJW630725-4 and WJW630725-5, collected 25 July 1963 by W. J. Wrenn, R. B. Loomis and R. M. Davis.

Diagnosis. — Larva similar to *Hannemania hylae* and *H. bufonis* in having one genuala II and III, and lacking femorale, but differing from *H. hylae* and *H. bufonis* in having tarsala II longer than tarsala I and coxa III with two or more setae.

Description of the holotype (all measurements in microns). — Body: Fully engorged, 1095 by 682, color in life orange; eyes 2/2, equal, ocular plate present.

Dorsal setal formula 2-4-10-8 + 41, total 65. Measurements: Humeral seta 59, seta of first posthumeral row 44 to 48, posterior dorsal seta 48 to 51.

Approximately 50 ventral setae. Measurements: Sternal seta 42, posterior ventral seta 33 to 37.

Scutum: Punctate, anteromedian projection without puncta, sensilla filiform (see Figure 1).

Scutal measurements of holotype (with mean and extremes of 10 paratypes unless otherwise noted): AW — (48, 45-53, 9), PW 67 (66, 62-72, 9), SB 26 (27, 26-29), ASB — (59, 56-62, 6), PSB 27 (28, 25-31, 8), AP 22 (19, 16-22, 9), AM 34 (34, 30-40, 6), AL 47 (42, 39-47, 8), PL 63 (66, 62-74, 8), S — (88, 81-93, 4).

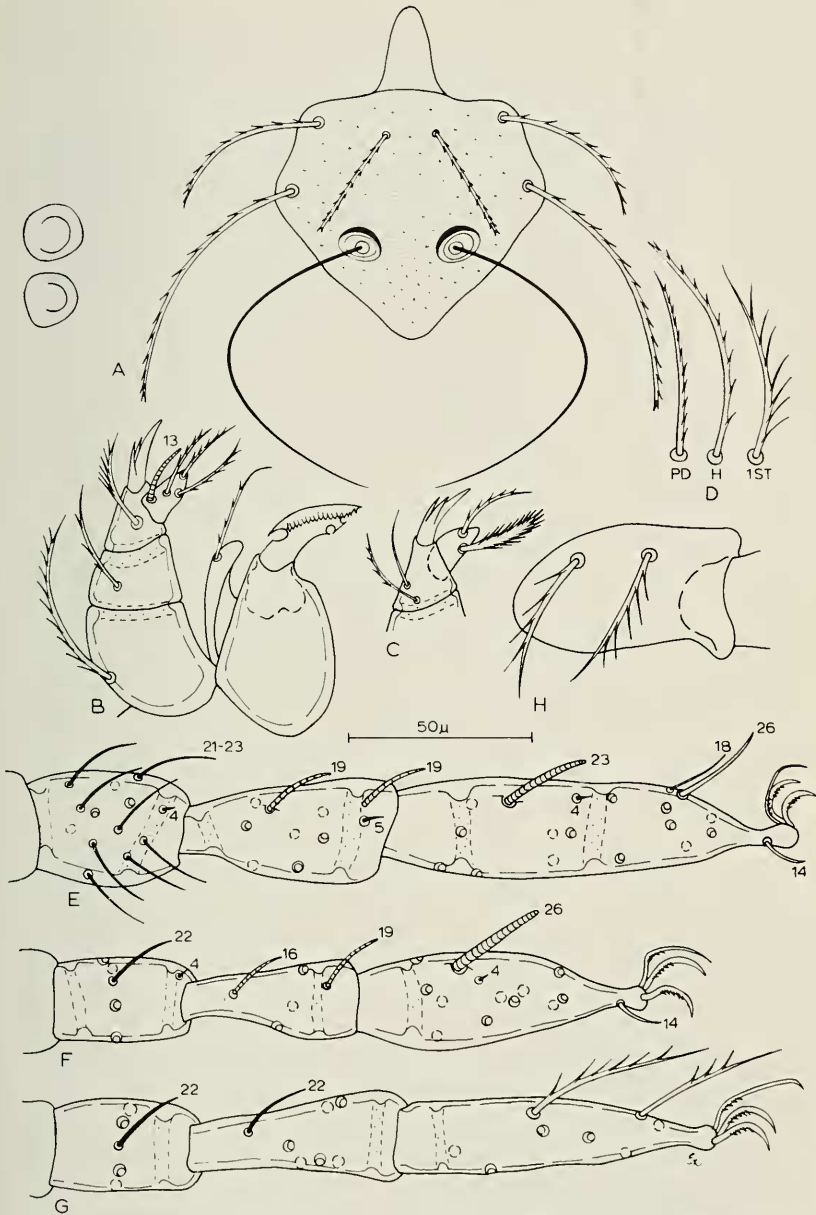


Figure 1. *Hannemania anurae*, n. sp. A. Scutum and eyes. B. Dorsal view of gnathosoma. C. Ventral aspect of palpotibia and tarsus. D. Representative body setae; PD, posterior dorsal. H, humeral. IST, first sternal. E. Leg I; genu, tibia and tarsus with nude setae and bases of branched setae, with measurements in microns. F. Leg II. G. Leg III. H. Coxa III with branched setae.

Gnathosoma: Cheliceral base and capitular sternum punctate. Galeala branched. Palpal formula B/B/BNB; palpal tarsus with 5 branched setae, and tarsala (13); palpotibial claw trifurcate.

Legs with specialized setae as follows: Leg I, with 8 (6-9) genualae and microgenualae; 2 tibialae and microtibialae; tarsala 22 (22, 21-23), microtarsala, subterminala, parasubterminala (occasionally branched) and pretarsala. Leg II, with genuala; 2 tibialae; tarsala 25 (25, 24-27), microtarsala and pretarsala. Leg III, coxa with 2 branched setae; genuala; tibiala. All legs with 6 punctate segments and terminating in 2 claws and clawlike empodium with onychotriches.

Leg measurements: I, 341 (310-360); II, 278 (250-287); III, 316 (271-335); total, 935 (831-982).

Ecological notes. — *Hannemania anurae* has been found on a variety of hosts in a wide range of habitats in western Mexico. Almost all hosts of *H. anurae* also had another species (undescribed) of *Hannemania*. Notable exceptions were all four specimens of *Syrrhophus modestus pallidus*, one *Rana pipiens* and the one *Rana montezumae*.

Hannemania anurae has been taken from *Rana pipiens*, *Rana pustulosa*, *Rana sinaloae*, and *Syrrhophus modestus pallidus* in Sinaloa, and *Hyla arenicolor* and *S. m. pallidus* in Nayarit, both in the Subtropical Dry Forest vegetation (Hardy and McDiarmid, 1969). In the Pine-Oak Forests (Leopold, 1959) *H. anurae* was taken from *Rana pipiens* and *Hyla eximia* southeast of Tepic, and from *R. pipiens* and *Rana tarahumarae* in Jalisco.

The specific name of *H. anurae* refers to the numerous species of anuran hosts.

Specimens examined (53). — SINALOA: 6.4 km SE Santa Lucia, 1341 m, 20 Aug. 1963, *Hyla arenicolor* (2); Santa Lucia to 2.2 km NE, 4 July 1962, *Rana sinaloae* (5), 11 July 1963, *R. sinaloae* (6), 13 July 1963, *Syrrhophus modestus pallidus* (1), 26 July 1963, *Rana pipiens* (5), 28 July 1963, *R. sinaloae* (1), 29 July 1963, *R. pipiens* (4), 9 Dec. 1964, *R. sinaloae* (1); 4.6 km W Santa Lucia, 29 July 1963, *R. pipiens* (2); 8.1 km SW Santa Lucia, 29 July 1963, *Rana pustulosa* (3). NAYARIT: 4.2 km E San Blas, 2 July 1962, *Syrrhophus modestus pallidus* (4); 35.7 km SE Tepic, 1410 m, 19 July 1962, *Hyla eximia* (2), *R. pipiens* (1). JALISCO: 8 km W Ameca, 21 June 1967, *R. pipiens* (5), *Rana tarahumarae* (1); 1.6 km N Encarnación, 6 Aug. 1962, *Rana montezumae* (10).

***Hannemania monticola*, new species**

Figure 2

Types. — Holotype and 9 paratypes from 1.6 km W Buenos Aires

(53 km W El Salto) on Mexican Hwy. 40, Durango, Mexico, 2300 m, from 8 *Hyla eximia* Baird, original number WJW620705-4, collected 5 July 1962 by W. J. Wrenn, and party.

Diagnosis. — Larva, similar to *Hannemania anurae*, *H. bufonis* and *H. hylae* in having one genuala on legs II and III and lacking femorales; but differing from *H. anurae* in having one seta on coxa III, from *H. bufonis* in having ocular plate 30 x 13 (average in *H. bufonis* 22 x 9), from *H. hylae* in having PL's long 63-79 (39-54 in *H. hylae*).

Description of holotype (all measurements in microns). — Body: Fully engorged, color in life orange; eyes 2/2, equal, ocular plate present.

Dorsal setae about 53. Measurements: Humeral seta 68, seta of first posthumeral row 54-59, posterior dorsal seta 50-56.

About 45 ventral seta. Measurements: First sternal seta 43, posterior ventral seta 31-45.

Scutum: Punctate except for anteromedian projection, sensilla filliform (see Figure 2).

Scutal measurements of holotype (with mean and extremes of 9 paratypes unless otherwise noted): AW 53 (55, 51-62), PW 71 (75, 71-86), SB 27 (29.5, 27-35), ASB 62 (63, 56-64) 8), PSB 28 (28, 25-31, AP 19 (21, 19-25), AM 31 (35, 31-45, 7), AL 39 (41, 39-47, 6), PL 63 (76, 63-79, 8), S — (91, 84-99, 3).

Gnathosoma: Cheliceral base and capitular sternum punctate. Galeala branched. Palpal formula B/B/BNB; palpal tarsus with 5 branched setae, tarsala 12; palpotibial claw trifurcate.

Legs with specialized setae as follows. Leg I with 5 (3-7) genualae and microgenuala; 2 tibialae and microtibialae; tarsala 28 (26, 24-30), microtarsala, subterminala, parasubterminala, and pretarsala. Leg II, with genuala and microgenuala; 2 tibialae; tarsala 27 (26, 25-28), microtarsala and pretarsala. Leg III, coxa with one branched seta; genuala; tibiala. All legs with six punctate segments and terminating in 2 claws and clawlike empodium with onychotriches.

Leg measurements: I, 412 (316-412); II, 344 (273-350); III, 369 (226-381); total, 1125 (815-1143).

Ecological notes. — *Hannemania monticola* has been taken only in the pine-oak forest (Baker and Greer, 1962) of western Durango. Eight of 39 *Hyla eximia* (including the type host) collected in rain pools along Highway 40 had *H. monticola*, although only two of them had more than one larva. One salamander, *Ambystoma rosaceum*, found under a log at the type locality, had a single *H. monticola*. Twenty-four specimens of *H. monticola* were taken from one specimen of *Tomodactylus saxatilis* along with the following species of *Hannemania*.

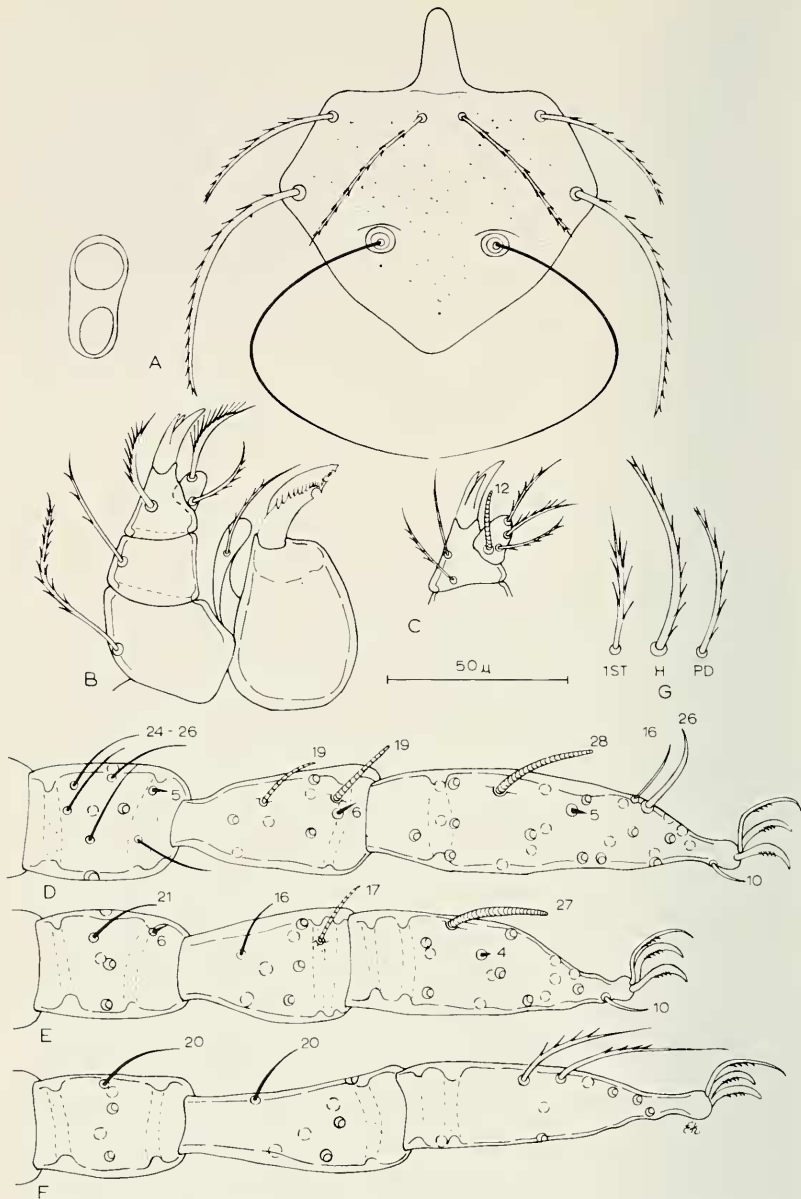


Figure 2. *Hannemania monticola*, n. sp. A. Scutum and eyes. B. Dorsal view of gnathosoma. C. Ventral aspect of palpotibia and tarsus. D. Leg I; genu, tibia and tarsus with nude setae and bases of branched setae, with measurements in microns. E. Leg II. F. Leg III. G. Representative body setae: 1ST, first sternal, H, humeral, PD, posterior dorsal.

The specific name of *H. monticola* alludes to the type locality which is high in the Sierra Madre Occidental.

Specimens examined (46). — DURANGO: 23.5 km SW Buenos Aires (75 km W El Salto), 10 June 1963, *Tomodactylus saxatilis* (24); 64.7 km W El Salto, 30 June 1967, *Hyla eximia* (2); 1.6 km W Buenos Aires (53 km W El Salto), 5 July 1962, 8 *H. eximia* (17), 18 Aug. 1963, *Ambystoma rosaceum* (1); 3.5 km W La Ciudad, 21 Aug. 1968, *H. eximia* (2).

***Hannemanina saxicola*, new species**

Figure 3

Types. — Holotype and 7 paratypes from 23.5 km SW Buenos Aires (75 km W El Salto), Durango, Mexico, from *Tomodactylus saxatilis* Webb, original number DGM630610M-4, collected 10 June 1963 by D. G. Marqua and P. H. Sullivan.

Diagnosis. — Larva, similar to *Hannemanina eltoni* in having 8-10 genualae I and legs II and III with 4-7 genualae, but differing from *H. eltoni* in having PL long (71-84, *H. eltoni* 45-50), leg III with 1-3 femorales (few *H. eltoni* with femorales III) and parasubterminala I branched (nude in *H. eltoni*).

Description of holotype (all measurements in microns). — Body: Fully engorged, 1736 by 1230, color in life orange; eyes 2/2, equal, ocular plate present.

Dorsal setal formula 2-4-8-8 + 23, total 45. Measurements: Humeral seta 66, seta of first posthumeral row 50-57, posterior dorsal seta 58-62.

Approximately 62 ventral setae. Measurements: Sternal seta 50, posterior dorsal seta 37-43.

Scutum: Punctate, anteromedian projection without puncta; widest between PL's being slightly longer than wide, sensilla filiform.

Scutal measurements of holotype (with mean and extremes of the 7 paratypes in parentheses unless otherwise noted): AW 54 (54, 51-58, 6), PW 74 (76, 74-84, 4), SB 28 (30, 28-34, 5), ASB 69 (70, 67-74, 3), PSB 27 (29, 27-32, 4), AP 24 (24, 22-28, 5), AM 45 (48, 44-54, 6), AL 47 (51, 47-54, 6), PL 75 (79, 71-84, 6), S — (97-105, 2).

Gnathosoma: Cheliceral base and capitular sternum punctate. Galeala branched. Palpal formula B/B/BNB; palpal tarsus with 5 branched setae, and tarsala (15); palpotibial claw trifurcate.

Legs with specialized setae as follows: Leg I, with 10 (6-10) genualae and microgenuala; 2 tibialae and microtibiala; tarsus with tarsala, 29 (30, 27-33), microtarsala, subterminala, parasubterminala branched

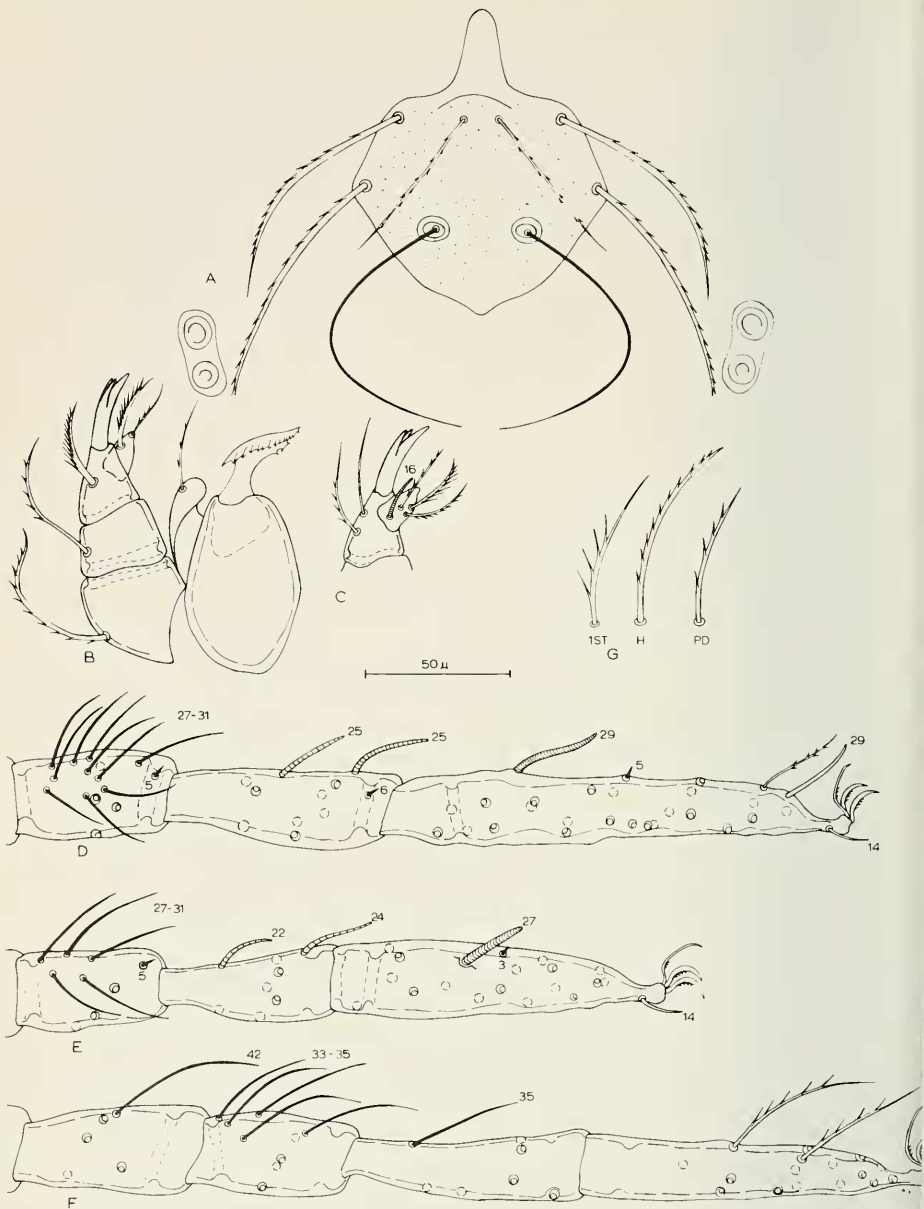


Figure 3. *Hannemania saxicola*, n. sp. A. Scutum and eyes. B. Dorsal view of gnathosoma. C. Ventral aspect of palpotibia and tarsus. D. Leg I; genu, tibia, and tarsus with nude setae and bases of branched setae, with measurements in microns. E. Leg II. F. Leg III; femur, genu, tibia and tarsus. G. Representative body setae; 1ST, first sternal, H, humeral, PD, posterior dorsal.

and pretarsala. Leg II, with 5 (3-5) genualae; 2 tibialae; tarsala, 28 (28.3, 27-29), microtarsala and pretarsala. Leg III, coxa with one branched seta; one femorala (one paratype with 3); 8 (5-9) genualae; tibiala. All legs with six punctate segments with 2 claws and clawlike empodium with onychotriches.

Leg measurements: I, 446 (381-465); II, 372 (350-394); III, 403 (301-419); total, 1221 (1032-1278).

Ecological notes. — *Hannemania saxicola* was found in association with 24 specimens of *H. monticola* on the type host, *Tomodactylus saxatilis*, which has been found in rocky areas of the Mixed-Tropical habitat (Webb, 1962). The specific name *H. saxicola* was derived from the specific name of the type host, which refers to the known host habitat.

Taxonomic notes. — The presence of at least one femorala on leg III is a diagnostic character of *H. saxicola*. Loomis (1956) found that *H. eltoni*, a similar species, only occasionally had a femorala on one leg III, and the femorala presumably replaced a branched seta as three rather than the normal four branched setae were present. In *H. saxicola* the femorala on leg III does not replace a branched seta as there are the normal four branched setae on femur III.

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